

CLAIMS:

1. A method for hermetically packaging a filter including the steps of providing a first wafer (1;27) bearing a plurality of bulk acoustic resonators (BARs) (2;28), providing a second wafer (8;30) having a plurality of wells (9;32), bonding the first and second wafers (1,8;27,30) to each other to form a composite wafer (1,8;36) in which the BARs (2;28) of the first wafer (1;27) are aligned with the wells (9;32) of the second wafer (8;30), and separating individual filters (2;28).

2. A method for hermetically packaging electric filters comprising a plurality of thin film bulk acoustic resonators (FBARs) where each resonator (2,28) is made up of a thin piezoelectric layer (2;19) sandwiched between two metal electrodes (4,5;20,21) and other layers of materials, by which the wafer (1;27) bearing a plurality of such FBAR filters (2;28) is bonded to at least one other wafer (8;30), into which wells (9;32) have previously been etched in the face to be bonded to the face of the first wafer (1;27) bearing the FBAR filters (2;28), said pair of wafers (1,8;27,30) forming a composite wafer (1,8;36), the individual filters (2;28) being separated after the wafers (1,8;27,30) have been processed.

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3. A method as claimed in claim 1 or claim 2 wherein holes (12;39) are etched and filled with metal (13;40) to allow contacts to be made to the filters (2;28).

4. A method as claimed in claim 1 or claim 2 wherein metal layers (44) are deposited on the edges of the filters (28) after they have been separated in order to allow contacts to be made to the filters.

5. A method as claimed in any one of the preceding claims wherein a third

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wafer (14;34) is bonded to the first wafer (1;27) on that face remote from the second wafer (8;30).

6. A method as claimed in any one of the preceding claims wherein one or more of the wafer bonding processes is undertaken under a vacuum.

7. A method as claimed in any one of the preceding claims wherein one or more of the wafer bonding processes used is anodic bonding employing a borosilicate bonding layer.

8. A method as claimed any one of claims 1 to 6 wherein one or more of the wafer bonding processes used employs a low melting point glass as the bonding layer and the bond is made by a combination of heat and pressure.

9. A method as claimed in any one of claims 1 to 6 wherein one or more of the wafer bonding processes used employs a metal or alloy as the bonding layer and the bond is made by a combination of heat and pressure.

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10. A filter made by the method according to any one of the preceding claims.

11. A filter according to claim 10 comprising an FBAR filter.

12. A filter according to claim 11 wherein each FBAR filter comprises a plurality of layers consisting of (from lower to upper): a substrate, a dielectric layer, one or more metal layers acting as a lower electrode, a piezoelectric layer, and one or more metal layers acting as an upper electrode.

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13. A filter according to claim 12 wherein each FBAR filter further comprises a top layer which can be either a conductor or an insulator.
14. A filter according to claim 10 comprising an SBAR filter.

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